

DRINKING WATER WORKS PERMIT

Permit Number: 196-201
Issue Number: 6

Pursuant to the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, and the regulations made thereunder and subject to the limitations thereof, I hereby issue this drinking water works permit under Part V of the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32 to:

The Corporation of the City of North Bay

200 McIntyre St. E.
North Bay, ON, PO Box 360

For the following municipal residential drinking water system:

North Bay Drinking Water System

This drinking water works permit includes the following:

Schedule	Description
Schedule A	Drinking Water System Description
Schedule B	General
Schedule C	All documents issued as Schedule C to this drinking water works permit which authorize alterations to the drinking water system
Schedule D	Process Flow Diagrams

Upon the effective date of this drinking water works permit # 196-201, all previously issued versions of permit # 196-201 are revoked and replaced by this permit.

DATED at TORONTO this 2nd day of February, 2022

Signature



Aziz Ahmed, P.Eng.
Director
Part V, *Safe Drinking Water Act*, 2002

Schedule A: Drinking Water System Description

System Owner	The Corporation of the City of North Bay
Permit Number	196-201
Drinking Water System Name	North Bay Drinking Water System
Permit Effective Date	February 2, 2022

1.0 System Description

- 1.1 The following is a summary description of the works comprising the above drinking water system:

Overview

The **North Bay Water Treatment Plant** is a SCADA controlled microfiltration membrane filtration system with medium pressure ultraviolet and chlorine disinfection systems. The plant treats water from Trout Lake which is part of the Mattawa River watershed. The process consists of pH adjustment (Sodium Hydroxide), fluoridation and disinfection by Sodium Hypochlorite injection and UV. Retentate from the primary membrane filtration system is treated by a secondary membrane filtration system discharging to a dedicated medium pressure UV before blending with permeate from the primary membrane filtration rack. There is a standby power natural gas/diesel generator. The intake structure is a 1200 mm diameter series 45 polyethylene pipe, with the capacity of 80,000 m³/day. The intake has a 90 degree elbow terminating with fibre reinforced plastic (FRP) cage. At the shore the polyethylene pipe connects to a concrete pressure pipe which runs to an intake chamber.

Surface Water Supply

Intake Polyethylene Pipe

Description	Pipe extending to an intake structure consisting of a steel inlet bell mouth with F.R.P. bars located in approximately 21.5 m of water, about 3.6 m off the lake bottom
Dimensions	1200 mm diameter polyethylene pipe extending 300 m into Trout Lake
Capacity	Capacity of 80,000 m ³ /d
Notes	

Treatment Plant

Name	North Bay Water Treatment Plant
Street Address	248 Lakeside Drive, District of Nipissing, ON
UTM Coordinates	NAD 83, Zone 17, Easting 0622427 m and Northing 51351359 m
System Type	Treatment and Distribution
Notes	The plant primarily consists of a microfiltration membrane followed by UV, chlorination, a high lift pumping station, and a fluoridation system.

Process Areas

Equipment	Primary and secondary membrane filtration system, including a feed wet well, reverse filtration pump and secondary waste tank and pump
	Primary and secondary UV disinfection system
	Split chlorine contact tank
	Split high lift pump well
	Three (3) chemical storage and delivery rooms housing membrane cleaning and neutralization chemical systems, pre-chlorination system, primary disinfection chemical system, residual chlorination chemical system, alkalinity adjustment system and fluoride addition system
	High lift pumping
	Generator room
	Electrical room
Notes	

Treatment Systems

Membrane Feed Pump Well/Prescreening

Equipment	Two (2) parallel sub-surface well chambers with level monitoring
	Two (2) 6 mm mesh manual pre-screens in series
	Five (5) vertical turbine pumps (4 duty and one standby), each rated at 20 ML/d feeding the primary membrane system
Notes	

Membrane Feed Strainers

Description	Five (5) automatic membrane feed strainers (four duty and one standby)
Dimensions	300 micron
Notes	

Membrane Filter Racks

Equipment	The "Primary Membrane Filters," eleven (11) racks of approximately 64 to 80 pressurized Microza USV 6203 membranes treating water from the membrane feed strainers.
	The "Secondary Membrane Filters," two (2) racks of approximately 40 to 48 pressurized Microza USV 6203 membranes treating backwash water from the primary membrane filters.
	Maximum production flow rate of 78.7 MLD based on a raw water flow rate of 79.5 MLD
	Ancillary systems including backwash pumps, instrument air for operating valves and integrity testing membranes, process blowers, and chemical cleaning and neutralization systems
	Two (2) FRP, batch Chemical tanks, one (1) acid & one (1) caustic; 2,500 gallons each; over common secondary containment; for chemical cleaning and maintenance of membranes.
Notes	

Ultraviolet Disinfection Systems: Primary

Description	Primary Ultraviolet Disinfection System
Location	Located downstream of the membrane racks, treating permeate (filtrate) combined from the primary and secondary membrane filter racks.
Equipment	Three (3) 600 mm UV reactors (one duty and two standby); Trojan Swift 6L24
Dosage	Each unit is designed to provide a minimum ultraviolet dosage of 10 millijoules per square centimetre
Notes	Each reactor contains medium pressure high intensity lamps housed in quartz sleeve and equipped with a self cleaning mechanism and intensity sensor

Ultraviolet Disinfection Systems: Secondary

Description	Secondary Ultraviolet Disinfection System
Location	Located downstream of the secondary membrane filter racks, treating permeate (filtrate) secondary membrane filter racks.
Equipment	Two (2) 300mm UV reactors, (both duty, each dedicated to one train); Trojan Swift4 4L12
Dosage	Each unit is designed to provide a minimum ultraviolet dosage of 15 millijoules per square centimetre
Notes	Each reactor contains medium pressure high intensity lamps housed in quartz sleeve and equipped with a self cleaning mechanism and intensity sensor

Chemical Injection System

Chemical System	Primary Injection Location	Chemical	Pump # / Duty
Zebra Mussel Control	Intake	Chlorine	1 / Duty
Primary Disinfection	Chlorine Contact Tank	Chlorine	1 / Duty
Common Standby	Intake or Chlorine Contact Tank	Chlorine	1 / Standby
Residual Chlorination	Chlorine Contact Tank/High Lift Pump Well junction	Chlorine	1 / Duty + 1 / Standby
Fluoride Dosing System	High Lift Pump Well junction	Hydrofluosilicic Acid	1 / Duty + 1 / Standby
pH Adjustment System	High Lift Pump Well junction	Alkali	1 / Duty + 1 / Standby
Membrane Cleaning	Clean-In-Place (CIP) Tanks 1 / Standby	Chlorine	1 / Duty + 1 / Standby
Membrane Cleaning - Acid	Clean-In-Place (CIP) Tanks 1 / Standby	Acid	1 / Duty + 1 / Standby
Chlorine Cleaning Solution neutralization	Neutralization Tanks	Reducing Agent for Dechlorination	1 / Duty + 1 / Standby
Acid Cleaning Solution neutralization	Neutralization Tanks	Alkali	1 / Duty + 1 / Standby
Corrosion Control	High Lift Pump Well Junction	Control Max	1 / Duty + 1 / Standby

Chlorine Contact Tank #1 and #2

Description	Two (2) baffled chlorine contact tanks in series with storage volumes of 688 m3 (Tank # 1) and 502 m3 (Tank # 2)
Notes	Contact tanks can be isolated (split) for maintenance.

Chlorine Disinfection System

Description	a sodium hypochlorite feed system
Equipment	Two (2) sodium hypochlorite storage tanks
	Five (5) sodium hypochlorite metering pumps one duty and one standby
	Piping and controls to add sodium hypochlorite at entrance to chlorine contact tanks and entrance to highlift pump well.
Notes	

Corrosion Control

Description	A sodium hydroxide feed system
Equipment	Two (2) sodium hydroxide storage tanks
	Two (2) sodium hydroxide metering pumps one duty and one standby
Notes	

Description	A zinc chloride/phosphoric acid feed system
Equipment	One (1) zinc chloride/phosphoric acid storage tank
	Two (2) metering pumps one duty and one standby
	Piping and controls to dose zinc chloride solution downstream of chlorine contact tank #2 and upstream of high lift pump well
Notes	

Fluoride Feed System

Description	A hydrofluosilicic acid feed system
Equipment	One (1) hydrofluosilicic acid storage tanks
	Two (2) metering pumps one duty and one standby
Notes	

High Lift Works**High Lift Pump Well #1**

Description	Equipped with one (1) variable speed and two (2) constant speed vertical turbine high lift pumps each rated at 20 MLD
Capacity	Well capacity of approx. 250 m3
Notes	

High Lift Pump Well #2

Description	Equipped with one (1) variable speed and one (1) constant speed vertical turbine high lift pump each rated at 20 MLD
Capacity	Well capacity of approx. 250 m3
Notes	

Generators

Dual Fuel Combustion Equipment

Description	One (1) dual fuel generator set (NG/Diesel) with a rating of 2050 kilowatts, to provide power during peak hours and emergency situations at the Water treatment plant
	One (1) above ground, 935 L, diesel fuel storage tank with secondary containment.
	One (1) underground, 22,700 L, diesel fuel storage tank, double walled with leak detection
Notes	

Standby Power at Remote Stations

Description	Standby diesel generators
Locations (diesel volume, tank, and protection)*	- Ellendale Reservoir (2x 1,893 L, AST, DW), - Airport Road Standpipe and Pumping Station (2x 1,111 L, AST, SC), - Canadore Pumping Station (1893 L, and 1000 L, AST, DW), - Judge Avenue Valve Chamber and Re-chlorination Station (87 L, GST, DW), - Birch's Road Standpipe and Re-chlorination Station (87 L, GST, DW) - Cedar Heights Pumping Station (2,270L, AST, DW), - Larocque Standpipe (295L, GST, DW)
Notes	*Above Ground Storage Tank (AST), Built-in Storage Tank (GST), Underground Storage Tank (UST), Secondary Containment (SC), Double-Walled (DW), Secondary Containment

Wastewater Disposal System

Primary Membrane Backwash Tank

Description	Two (2) membrane feed pumps supplying water to the Secondary Membrane System
Capacity	Tank with a volume of approximately 310 m3
Notes	

Secondary Waste Tank

Description	Two (2) pumps, one duty and one standby, to deliver water to the sanitary sewer.
Capacity	Tank with a volume of approximately 130 m3
Notes	

Neutralization Tank #1 and #2

Equipment	Three (3) Neutralization pumps to circulate water in Neutralization tanks. pH and chlorine residual analyzers.
Capacity	Two (2) tanks each with a volume of 150 m3
Notes	

Sanitary Sewage Disposal

Description	Discharging to the sanitary sewer along Lakeside Drive
Equipment	One sump with two (2) submersible pumps in the Administration Area One (1) sump with two (2) submersible pumps in the Process Area
Notes	

General Distribution System Facilities**Ellendale Reservoir, High Lift Pump Station and Re-chlorination Facility**

Description	A reinforced concrete at-grade, double cell, unbaffled, treated water reservoir
Location	Located at the east end of Ellendale Dr
UTM Coordinates	NAD83, Zone 17, Easting 0619465 m and Northing 5132625 m
Capacity	Approximate capacity of 18,200 m3
Dimensions	71 m by 38 m by 7 m
Equipment	Four vertical double suction high lift pumps, two (2) rated at 5,000 m3/d at a TDH of 90 m, and driven by a 94 kW motor, two (2) rated at 13,650 m3/d at a TDH of 90 m, and driven by a 186 kW motor One (1) 450 kW diesel engine for standby power, capable of supplying power to operate the entire station for manual operation A sodium hypochlorite disinfection system for re-chlorination, consisting of two (2) sodium hypochlorite solution storage tank and four (4) (2 duty.2 standby), one pump feed line to the main suction header to maintain the desired chlorine residual at the analyzer. And; Chlorine injection point for zone "D" to increase residual as it leaves the reservoir, The chlorine is dosed when the flow meter is reading negative flow (water leaving the reservoir) and the downstream chlorine analyzer monitoring the residual chlorine. . Instrumentation to provide transmission of continuously monitored process parameters to the main treatment plant, including free chlorine, SCADA system for historical trending and operational decision making UPS battery with 3 hours of standby power for SCADA system two (2) double wall diesel storage tanks at Ellendale Reservoir Addition of one new chlorination point on inlet/outlet pipe complete with a new chlorine analyzer
Notes	

Airport Road Standpipe and Booster Pumping Station

Description	One (1) glass fused to steel, unbaffled, treated water standpipe equipped with continuous monitoring for tank level and a 270 m ² booster pumping station
Location	Located at the corner of Airport Road and Airport Way
UTM Coordinates	NAD83, Zone 17, Easting 0621097 m and Northing 5134725 m
Capacity	Approximate capacity of 4,063 m ³
Dimensions	14m diameter 29m high
Equipment	Three (3) pumps (two duty/one standby configuration) to supply pressure to pressure zone 4. Four (4) pumps, three (3) duty one standby to supply pressure to pressure zone 5. Pumping station complete with electrical and electronic control system, pressure transducers connect to the suction and discharge piping, a magnetic flow meter connect to discharge piping, ventilation system, valves, bypass piping.
	A sodium hypochlorite disinfection system for re-chlorination, consisting of sodium hypochlorite solution storage tank and two (2) chemical solution metering pumps, together with a solution feed line to the main suction header to maintain the desired chlorine residual at the analyzer
	Two (2) fire pumps, one for duty and one for standby, each rated at 125 L/s
	500 kW diesel generator set to power the pumping station during power outages.
	Two (2) single wall diesel storage tanks at Airport Standpipe, located inside a secondary containment area.
Notes	

Birchs Road Standpipe and Re-chlorination System

Description	One (1) steel, unbauffed, treated water standpipe operating at a typical water depth of 36 meters, equipped with continuous monitoring for tank level and a 90 m2 control building
Location	Located near the southwest corner of Birchs Road and Booth Road
UTM Coordinates	NAD 83, Zone 17, Easting 0621648 m and Northing 5124761 m
Capacity	11,775 m3 capacity
Dimensions	19 m diameter 39 m high
Equipment	A sodium hypochlorite disinfection system for re-chlorination, consisting of one (1) sodium hypochlorite solution storage tank and two (2) chemical solution metering pumps, together with a solution feed line to the standpipe feed pipe and a control system to maintain the desired residual; free chlorine analyzers
	A UPS battery with 3 hours of standby power for SCADA system
	A fixed 7.5 kW, 120/240 Volt, single phase, diesel generator to power the tower systems during prolonged power outages
	Submerged mixer (Pax Model PWM400)
Notes	

Judge Avenue Valve Chamber and Re-chlorination Station

Description	A valve and re-chlorination station
Location	Located near the northeast corner of Judge Avenue and Lakeshore Drive
UTM Coordinates	NAD 83, Zone 17, Easting 0618996 m and Northing 5128225 m
Capacity	Not Applicable
Dimensions	6.2 m2 control building
Equipment	A sodium hypochlorite disinfection system for re-chlorination, for contingency and emergency use, consisting of one (1) sodium hypochlorite solution storage tank and one (1) chemical solution metering pump, together with a solution feed line to the watermain below and a control system to maintain the desired residual
	An actuated valve on the bypass for pressure control during maintenance
	UPS battery with 3 hours of standby power for SCADA system
	A fixed 7.5 kW, 120/240 Volt, single phase, diesel generator to power the re-chlorination station systems during prolonged power outages
	Spill containment for sodium hypochlorite storage
	Duplex panel with two (2) chlorine feed pumps, complete with automatic switchover and alarms
Notes	

CFB Standpipe

Location	Located at the corner of Airport Road and Airport Way
UTM Coordinates	NAD 83, Zone 17, Easting 0621097 m and Northing 5134725 m
Description	One (1) glass fused to steel, unbaffled, treated water standpipe equipped with mixer and continuous monitoring for tank level.
Dimensions and Capacity	One (1) storage tank, approximately 14.55m diameter x 14.25 m high with a useable volume of 2280 m ³
Equipment	An electric mixer
Instrumentation	- Two (2) (duty and standby) Level transducers and transmitters - One (1) Pressure transducer
Standby Power	Standby power is supplied by a 500 kW diesel generator located at the adjacent Airport Road Booster Pumping Station.
Notes	The CBF Standpipe and the Airport Road Standpipe and Booster Pumping Station are located in the same property

Canadore Pumping Station

Location	Located at the intersection of Gormanville Road and McKeown Avenue
UTM Coordinates	NAD 83, Zone 17, Easting 616431 m and Northing 5132400 m
Equipment	One (1) capable of pumping 860 m ³ /d, at a TDH of 55 m and driven by a 14.92 kW electric motor One (1) pump capable of pumping 4,600 m ³ /d at a TDH of 58 m and driven by a 74.6 kW electric motor Pressurized cushion tanks; and free chlorine on-line analyzer One (1) primary fire pump capable of pumping 2,300 m ³ /d at a TDH of 55 m, followed by an actuated valve and driven by a 29.8 kW electric motor
Standby Power	One (1) standby fire pump capable of pumping 9,150 m ³ /d at a TDH of 58 m and driven by a 140.24 kW diesel engine One (1) fixed 303HP single phase diesel generator to power the pump station systems during prolonged power outages
Notes	

Cedar Heights Booster Pumping Station

Location	On College Drive, approximately 2,050 m north-west of the intersection of College Drive and Gormanville Road
UTM Coordinates	NAD 83, ZONE 17, Easting 615984 m and Northing 5132865 m
Equipment	Two (2) split case centrifugal pumps, in lead/lag configuration, each with a capacity of 62.5 L/s at a TDH of 74 m and driven by a 75 kW electric motor. One (1) 1,000 L hydro-pneumatic expansion tank Pressure transmitters (one duty/ one standby) located on suction and discharge piping of BPS One (1) continuous chlorine residual analyzer for measurement of incoming water

Standby Power	One (1) 300 kW diesel generator
	One (1) 2,270 L fuel storage tank
Notes	The two (2) Cedar Heights BPS pumps running together will supply up to 176 L/s, which satisfies the 24.4 L/s maximum day demand (MDD) flow requirement and provides 152 L/s of fire flow while maintaining at least 138 kPa (20 psi) at all locations in the system. Pump P3 in the existing Canadore BPS, which has a rated capacity of 106 L/s at 58 m of TDH, will be used to provide firm capacity to the Cedar Heights BPS in Phase 1A of construction. Pump P3 will only run if one of the pumps at the Cedar Heights BPS is offline or fails to start and a fire condition occurs.

Larocque Standpipe

Description	One (1) steel, unbaffled, treated water standpipe operating at a maximum water depth of 20 meters, equipped with continuous monitoring for tank level. Top water level of 346.4 m a.s.l. and overflow level of 346.7 m a.s.l. and hydrodynamic mixing system and a 400 mm diameter combined inlet/outlet pipe on the standpipe site.
Location	291 Larocque Road, North Bay ON
UTM Coordinates	NAD 83: UTM zone 17, 613400 m E 5134622 m N
Capacity	4,100 m ³
Dimensions	15 m diameter 22 m high
Equipment	Data relayed to PLC and SCADA to control operation of the Cedar Heights Booster Pumping Station
	10 kW Standby emergency diesel generator with approximately 295 L sub base double walled fuel tank in a weather-proof enclosure and an Automatic Transfer Switch.
Notes	Tank overflow and drain pipe discharge to an onsite dechlorination pond which connects to a ditch on Larocque Road.

Plant Monitoring and Control System

SCADA System

Description	A Supervisory Control and Data Acquisition (SCADA) system to control the main pumping units and chemical feed pumps, along with telemetry information from the water distribution system to monitor and control process facilities and equipment at the water treatment plant, pumping and storage requirements, including automated operations with manual control options and alarm systems to operators on call
Location	Located in the office/control room
Notes	System control with data acquisition including various on-line analyzers and monitors, including the following regulatory equipment: - Chlorine Analyzers – CCT 1, CCT 2, POE - PH Monitoring – CCT 1, CCT 2, POE - Level Sensors – CCT 1, CCT 2, HLPW - Fluoride Analyzer – POE - Turbidity Analyzers (13) – Filtrate - Flow Meter – Raw water, Post filtration, Treated water

	- Temperature probe - - Turbidity Analyzer – POE - UV Transmittance and Dose
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Fuel Oil Systems

North Bay Water Treatment Plant

Location	248 Lakeside Dr. North Bay
Description	22,700L Underground fuel storage tank 935L Above ground fuel storage tank
Fuel Type	diesel
Source Protection Area	N/A
Notes	

Airport Standpipe and Booster Station

Location	1346 Airport Road, North Bay
Description	Two (2) 1111L above ground storage tanks
Fuel Type	diesel
Source Protection Area	N/A
Notes	

Ellendale Reservoir and Booster Station

Location	80 Ellendale Dr. North Bay
Description	Two (2) 1893L above ground storage tanks
Fuel Type	Diesel
Source Protection Area	N/A
Notes	

Canadore Pumping Station

Location	Gormanville Road
Description	2270L above ground storage tank
Fuel Type	diesel
Source Protection Area	N/A
Notes	

Cedar Heights Booster Station

Location	College Dr. North Bay
Description	2270L above ground fuel storage tank
Fuel Type	Diesel
Source Protection Area	N/A
Notes	

Birch's Standpipe

Location	Birch's Rd., North Bay
Description	87L built in fuel storage tank
Fuel Type	Diesel
Source Protection Area	N/A
Notes	

Larocque Standpipe

Location	Larocque Rd North Bay, ON
Description	295L built in fuel storage tank
Fuel Type	diesel
Source Protection Area	N/A
Notes	

Watermains

1.2 Watermains within the distribution system comprise:

1.2.1 Watermains that have been set out in each document or file identified in column 1 of Table 1.

Table 1: Watermains	
Column 1 Document or File Name	Column 2 Date
North Bay Water Distribution System Map	-----

1.2.2 Watermains that have been added, modified, replaced or extended further to the provisions of Schedule C of this drinking water works permit on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

1.2.3 Watermains that have been added, modified, replaced or extended further to an authorization by the Director on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

Schedule B: General

System Owner	The Corporation of the City of North Bay
Permit Number	196-201
Drinking Water System Name	North Bay Drinking Water System
Permit Effective Date	February 2, 2022

1.0 Applicability

- 1.1 In addition to any other applicable legal requirements, the drinking water system identified above shall be altered and operated in accordance with the conditions of this drinking water works permit and the licence #196-101.
- 1.2 The definitions and conditions of licence #196-101 are incorporated into this permit and also apply to this drinking water system.

2.0 Alterations to the Drinking Water System

- 2.1 Any document issued by the Director to be incorporated into Schedule C to this drinking water works permit shall provide authority to alter the drinking water system in accordance with the applicable conditions of this drinking water works permit and licence #196-101.
- 2.2 All documents issued by the Director as described in condition 2.1 shall form part of this drinking water works permit.
- 2.3 All parts of the drinking water system in contact with drinking water that are added, modified, replaced, extended shall be disinfected in accordance with a procedure approved by the Director or in accordance with the applicable provisions of the following documents:
- a) The ministry's Watermain Disinfection Procedure, dated August 1, 2020;
 - b) Subject to condition 2.3.2, any updated version of the ministry's Watermain Disinfection Procedure;
 - c) AWWA C652 – Standard for Disinfection of Water-Storage Facilities;
 - d) AWWA C653 – Standard for Disinfection of Water Treatment Plants; and
 - e) AWWA C654 – Standard for Disinfection of Wells.
- 1.0 For greater clarity, where an activity has occurred that could introduce contamination, including but not limited to repair, maintenance, or physical / video inspection, all equipment that may come in contact with the drinking water system shall be disinfected in accordance with the requirements of condition 2.3. above.
- 2.3.2 Updated requirements described in condition 2.3 b) are effective six months from the date of publication of the updated Watermain Disinfection Procedure.

- 2.4 The owner shall notify the Director in writing within thirty (30) days of the placing into service or the completion of any addition, modification, replacement, removal or extension of the drinking water system which had been authorized through:
- 2.4.1 Schedule B to this drinking water works permit which would require an alteration of the description of a drinking water system component described in Schedule A of this drinking water works permit;
 - 2.4.2 Any document to be incorporated in Schedule C to this drinking water works permit respecting works other than watermain; or
 - 2.4.3 Any approval issued prior to the issue date of the first drinking water works permit respecting works other than watermain which were not in service at the time of the issuance of the first drinking water works permit.
- 2.5 The notification required in condition 2.4 shall be submitted using the "Director Notification Form" published by the Ministry.
- 2.6 For greater certainty, the notification requirements set out in condition 2.4 do not apply to any addition, modification, replacement, removal or extension in respect of the drinking water system which:
- 2.6.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03;
 - 2.6.2 Constitutes maintenance or repair of the drinking water system; or
 - 2.6.3 Is a watermain authorized by condition 3.1 of Schedule B of this drinking water works permit.
- 2.7 The owner shall notify the legal owner of any part of the drinking water system that is prescribed as a municipal drinking water system by section 2 of O. Reg. 172/03 of the requirements of the licence and this drinking water works permit as applicable to the prescribed system.
- 2.8 For greater certainty, the owner may only carry out alterations to the drinking water system in accordance with this drinking water works permit after having satisfied other applicable legal obligations, including those arising from the *Environmental Assessment Act*, *Niagara Escarpment Planning and Development Act*, *Oak Ridges Moraine Conservation Act, 2001* and *Greenbelt Act, 2005*.

3.0 Watermain Additions, Modifications, Replacements and Extensions

- 3.1 The owner may alter the drinking water system, or permit it to be altered by a person acting on the owner's behalf, by adding, modifying, replacing or extending a watermain within the distribution system subject to the following conditions:
- 3.1.1 The design of the watermain addition, modification, replacement or extension:
 - a) Has been prepared by a licensed engineering practitioner;
 - b) Has been designed only to transmit water and has not been designed to treat water;

- c) Satisfies the design criteria set out in the Ministry publication “Watermain Design Criteria for Future Alterations Authorized under a Drinking Water Works Permit – June 2012”, as amended from time to time; and
 - d) Is consistent with or otherwise addresses the design objectives contained within the Ministry publication “Design Guidelines for Drinking Water Systems, 2008”, as amended from time to time.
- 3.1.2 The maximum demand for water exerted by consumers who are serviced by the addition, modification, replacement or extension of the watermain will not result in an exceedance of the rated capacity of a treatment subsystem or the maximum flow rate for a treatment subsystem component as specified in the licence, or the creation of adverse conditions within the drinking water system.
- 3.1.3 The watermain addition, modification, replacement or extension will not adversely affect the distribution system’s ability to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions.
- 3.1.4 Secondary disinfection will be provided to water within the added, modified, replaced or extended watermain to meet the requirements of O. Reg. 170/03.
- 3.1.5 The watermain addition, modification, replacement or extension is wholly located within the municipal boundary over which the owner has jurisdiction.
- 3.1.6 The owner of the drinking water system consents in writing to the watermain addition, modification, replacement or extension.
- 3.1.7 A licensed engineering practitioner has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of condition 3.1.1.
- 3.1.8 The owner of the drinking water system has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of conditions 3.1.2 to 3.1.6.
- 3.2 The authorization for the addition, modification, replacement or extension of a watermain provided for in condition 3.1 does not include the addition, modification, replacement or extension of a watermain that:
- 3.2.1 Passes under or through a body of surface water, unless trenchless construction methods are used;
 - 3.2.2 Has a nominal diameter greater than 750 mm;
 - 3.2.3 Results in the fragmentation of the drinking water system; or
 - 3.2.4 Connects to another drinking water system, unless:
 - a) Prior to construction, the owner of the drinking water system seeking the connection obtains written consent from the owner or owner’s delegate of the drinking water system being connected to; and

- b) The owner of the drinking water system seeking the connection retains a copy of the written consent from the owner or owner's delegate of the drinking water system being connected to as part of the record that is recorded and retained under condition 3.3.
- 3.3 The verifications required in conditions 3.1.7 and 3.1.8 shall be:
- 3.3.1 Recorded on "Form 1 – Record of Watermains Authorized as a Future Alteration", as published by the Ministry, prior to the watermain addition, modification, replacement or extension being placed into service; and
- 3.3.2 Retained for a period of ten (10) years by the owner.
- 3.4 For greater certainty, the verification requirements set out in condition 3.3 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:
- 3.4.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
- 3.4.2 Constitutes maintenance or repair of the drinking water system.
- 3.5 The document or file referenced in Column 1 of Table 1 of Schedule A of this drinking water works permit that sets out watermains shall be retained by the owner and shall be updated to include watermain additions, modifications, replacements and extensions within 12 months of the addition, modification, replacement or extension.
- 3.6 The updates required by condition 3.5 shall include watermain location relative to named streets or easements and watermain diameter.
- 3.7 Despite clause (a) of condition 3.1.1 and condition 3.1.7, with respect to the replacement of an existing watermain or section of watermain that is 6.1 meters in length or less, if a licensed engineering practitioner has:
- 3.7.1 inspected the replacement prior to it being put into service;
- 3.7.2 prepared a report confirming that the replacement satisfies clauses (b), (c) and (d) of condition 3.1.1 (i.e. "Form 1 – Record of Watermains Authorized by a Future Alteration" (Form 1), Part 3, items No. 2, 3 and 4); and
- 3.7.3 appended the report referred to in condition 3.7.2 to the completed Form 1,
- the replacement is exempt from the requirements that the design of the replacement be prepared by a licensed engineering practitioner and that a licensed engineering practitioner verify on Form 1, Part 3, item No. 1 that a licensed engineering practitioner prepared the design of the replacement.
- 3.8 For greater certainty, the exemption in condition 3.7 does not apply to the replacement of an existing watermain or section of watermain if two or more sections of pipe, each of which is 6.1 meters in length or less, are joined together, if the total length of replacement pipes joined together is greater than 6.1 meters.

4.0 Minor Modifications to the Drinking Water System

- 4.1 The drinking water system may be altered by adding, modifying or replacing the following components in the drinking water system:
- 4.1.1 Coagulant feed systems in the treatment system, including the location and number of dosing points:
 - a) Prior to making any alteration to the drinking water system under condition 4.1.1, the owner shall undertake a review of the impacts that the alteration might have on corrosion control or other treatment processes; and
 - b) The owner shall notify the Director in writing within thirty (30) days of any alteration made under condition 4.1.1 and shall provide the Director with a copy of the review.
 - c) The notification required in condition 4.1.1 b) shall be submitted using the "Director Notification Form" published by the Ministry
 - 4.1.2 Instrumentation and controls, including new SCADA systems and upgrades to SCADA system hardware;
 - 4.1.3 SCADA system software or programming that:
 - a) Measures, monitors or reports on a regulated parameter;
 - b) Measures, monitor or reports on a parameter that is used to calculate CT; or,
 - c) Calculates CT for the system or is part of the process algorithm that calculates log removal, where the impacts of addition, modification or replacement have been reviewed by a licensed engineering practitioner;
 - 4.1.4 Filter media, backwashing equipment, filter troughs, and under-drains and associated equipment in the treatment system;
 - 4.1.5 Spill containment works; or,
 - 4.1.6 Coarse screens and fine screens
- 4.2 The drinking water system may be altered by adding, modifying, replacing or removing the following components in the drinking water system:
- 4.2.1 Treated water pumps, pressure tanks, and associated equipment;
 - 4.2.2 Raw water pumps and process pumps in the treatment system;
 - 4.2.3 Inline booster pumping stations that are not associated with distribution system storage facilities and are on a watermain with a nominal diameter not exceeding 200 mm;
 - 4.2.4 Re-circulation devices within distribution system storage facilities;

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- 4.2.5 In-line mixing equipment;
 - 4.2.6 Chemical metering pumps and chemical handling pumps;
 - 4.2.7 Chemical storage tanks (excluding fuel storage tanks) and associated equipment; or,
 - 4.2.8 Measuring and monitoring devices that are not required by regulation, by a condition in the Drinking Water Works Permit, or by a condition otherwise imposed by the Ministry.
 - 4.2.9 Chemical injection points.
 - 4.2.10 Valves;
- 4.3 The drinking water system may be altered by replacing the following:
- 4.3.1 Raw water piping, treatment process piping or treated water piping within the treatment subsystem;
 - 4.3.2 Measuring and monitoring devices that are required by regulation, by a condition in the Drinking Water Works Permit or by a condition otherwise imposed by the Ministry.
 - 4.3.3 Coagulants and pH adjustment chemicals, where the replacement chemicals perform the same function;
 - a) Prior to making any alteration to the drinking water system under condition 4.3.3, the owner shall undertake a review of the impacts that the alteration might have on corrosion control or other treatment processes; and
 - b) The owner shall notify the Director in writing within thirty (30) days of any alteration made under condition 4.3.3 and shall provide the Director with a copy of the review.
 - c) The notification required in condition 4.3.3 b) shall be submitted using the "Director Notification Form" published by the Ministry
- 4.4 Any alteration of the drinking water system made under conditions 4.1, 4.2 or 4.3 shall not result in:
- 4.4.1 An exceedance of a treatment subsystem rated capacity or a treatment subsystem component maximum flow rate as specified in the licence;
 - 4.4.2 The bypassing or removal of any unit process within a treatment subsystem;
 - 4.4.3 The addition of any new unit process other than coagulation within a treatment subsystem;
 - 4.4.4 A deterioration in the quality of drinking water provided to consumers;

- 4.4.5 A reduction in the reliability or redundancy of any component of the drinking water system;
- 4.4.6 A negative impact on the ability to undertake compliance and other monitoring necessary for the operation of the drinking water system; or
- 4.4.7 An adverse effect on the environment.
- 4.5 The owner shall verify in writing that any addition, modification, replacement or removal of drinking water system components in accordance with conditions 4.1, 4.2 or 4.3 has met the requirements of the conditions listed in condition 4.4.
- 4.6 The verifications and documentation required in condition 4.5 shall be:
 - 4.6.1 Recorded on "Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System" published by the Ministry, prior to the modified or replaced components being placed into service; and
 - 4.6.2 Retained for a period of ten (10) years by the owner.
- 4.7 For greater certainty, the verification requirements set out in conditions 4.5 and 4.6 do not apply to any addition, modification, replacement or removal in respect of the drinking water system which:
 - 4.7.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
 - 4.7.2 Constitutes maintenance or repair of the drinking water system, including software changes to a SCADA system that are not listed in condition 4.1.3
- 4.8 The owner shall update any drawings maintained for the drinking water system to reflect the modification or replacement of the works, where applicable.

5.0 Equipment with Emissions to the Air

- 5.1 The drinking water system may be altered by adding, modifying or replacing any of the following drinking water system components that may discharge or alter the rate or manner of a discharge of a compound of concern to the air:
 - 5.1.1 Any equipment, apparatus, mechanism or thing that is used for the transfer of outdoor air into a building or structure that is not a cooling tower;
 - 5.1.2 Any equipment, apparatus, mechanism or thing that is used for the transfer of indoor air out of a space used for the production, processing, repair, maintenance or storage of goods or materials, including chemical storage;
 - 5.1.3 Laboratory fume hoods used for drinking water testing, quality control and quality assurance purposes;
 - 5.1.4 Low temperature handling of compounds with a vapor pressure of less than 1 kilopascal;

- 5.1.5 Maintenance welding stations;
 - 5.1.6 Minor painting operations used for maintenance purposes;
 - 5.1.7 Parts washers for maintenance shops;
 - 5.1.8 Emergency chlorine and ammonia gas scrubbers and absorbers;
 - 5.1.9 Venting for activated carbon units for drinking water taste and odour control;
 - 5.1.10 Venting for a stripping unit for methane removal from a groundwater supply;
 - 5.1.11 Venting for an ozone treatment unit;
 - 5.1.12 Natural gas or propane fired boilers, water heaters, space heaters and make-up air units with a total facility-wide heat input rating of less than 20 million kilojoules per hour, and with an individual fuel energy input of less than or equal to 10.5 gigajoules per hour; or
 - 5.1.13 Emergency generators that fire No. 2 fuel oil (diesel fuel) with a sulphur content of 0.5 per cent or less measured by weight, natural gas, propane, gasoline or biofuel, and that are used for emergency duty only with periodic testing.
- 5.2 The owner shall not make an addition, modification, or replacement described in condition 5.1 in relation to an activity that is not related to the treatment and/or distribution of drinking water.
- 5.3 The emergency generators identified in condition 5.1.13 shall not be used for non-emergency purposes including the generation of electricity for sale or for peak shaving purposes.
- 5.4 The owner shall prepare an emission summary table for nitrogen oxides emissions only, for each addition, modification or replacement of emergency generators identified in condition 5.1.13.

Performance Limits

- 5.5 The owner shall ensure that a drinking water system component identified in conditions 5.1.1 to 5.1.13 is operated at all times to comply with the following limits:
- 5.5.1 For equipment other than emergency generators, the maximum concentration of any compound of concern at a point of impingement shall not exceed the corresponding point of impingement limit;
 - 5.5.2 For emergency generators, the maximum concentration of nitrogen oxides at sensitive receptors shall not exceed the applicable point of impingement limit, and at non-sensitive receptors shall not exceed the Ministry half-hourly screening level of 1880 ug/m³ as amended; and
 - 5.5.3 The noise emissions comply at all times with the limits set out in publication NPC-300, as applicable.

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- 5.6 The owner shall verify in writing that any addition, modification or replacement of works in accordance with condition 5.1 has met the requirements of the conditions listed in condition 5.5.
- 5.7 The owner shall document how compliance with the performance limits outlined in condition 5.5.3 is being achieved, through noise abatement equipment and/or operational procedures.
- 5.8 The verifications and documentation required in conditions 5.6 and 5.7 shall be:
- 5.8.1 Recorded on "Form 3 – Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere", as published by the Ministry, prior to the additional, modified or replacement equipment being placed into service; and
- 5.8.2 Retained for a period of ten (10) years by the owner.
- 5.9 For greater certainty, the verification and documentation requirements set out in conditions 5.6 and 5.8 do not apply to any addition, modification or replacement in respect of the drinking water system which:
- 5.9.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
- 5.9.2 Constitutes maintenance or repair of the drinking water system.
- 5.10 The owner shall update any drawings maintained for the works to reflect the addition, modification or replacement of the works, where applicable.

6.0 Previously Approved Works

- 6.1 The owner may add, modify, replace or extend, and operate part of a municipal drinking water system if:
- 6.1.1 An approval was issued after January 1, 2004 under section 36 of the SDWA in respect of the addition, modification, replacement or extension and operation of that part of the municipal drinking water system;
- 6.1.2 The approval expired by virtue of subsection 36(4) of the SDWA; and
- 6.1.3 The addition, modification, replacement or extension commenced within five years of the date that activity was approved by the expired approval.

7.0 System-Specific Conditions

- 7.1 Not Applicable

8.0 Source Protection

- 8.1 Not Applicable

Schedule C: Authorization to Alter the Drinking Water System

System Owner	The Corporation of the City of North Bay
Permit Number	196-201
Drinking Water System Name	North Bay Drinking Water System
Permit Effective Date	February 2, 2022

1.0 General

1.1 Table 2 provides a reference list of all documents to be incorporated into Schedule C that have been issued as of the date that this permit was issued.

1.1.1 Table 2 is not intended to be a comprehensive list of all documents that are part of Schedule C. For clarity, any document issued by the Director to be incorporated into Schedule C after this permit has been issued is considered part of this drinking water works permit.

Table 2: Schedule C Documents

Column 1 Issue #	Column 2 Issued Date	Column 3 Description	Column 4 Status	Column 5 DN#
1	2011/04/12	Corrected typo on page 1, under Licence Amendments; 1.1 General Requirements.	-	-
2	2014/12/16	PAX Water tower mixer	Archived	3
3	2015/05/12	Booster Pumping Station	Archived	2
4	2017/08/14	New Larocque water storage standpipe	Archived	1

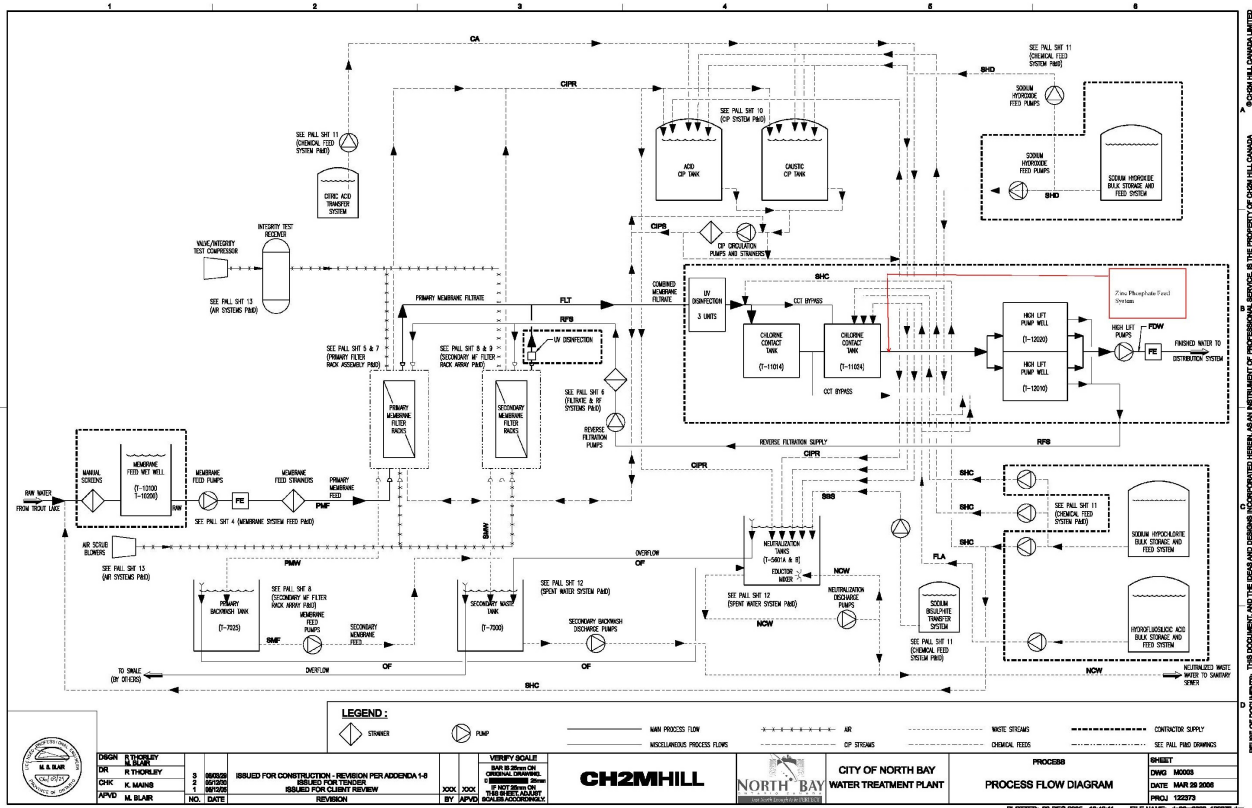
1.2 For each document described in columns 1, 2 and 3 of Table 2, the status of the document is indicated in column 4. Where this status is listed as 'Archived', the approved alterations have been completed and relevant portions of this permit have been updated to reflect the altered works. These 'Archived' Schedule C documents remain as a record of the alterations.

Schedule D: Process Flow Diagrams

System Owner	The Corporation of the City of North Bay
Permit Number	196-201
Drinking Water System Name	North Bay Drinking Water System
Permit Effective Date	February 2, 2022

1.0 Process Flow Diagrams

North Bay Water Treatment Plant



[Source: Operational Plan, Revision 3, October 2009]

Note: this process flow diagram is for reference only, and represents a high level overview of the system as of October 2009.